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Cross-race Effect: the Role of Social and Individual Factors in Face Recognition Process

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Abstract

The social and psychological peculiarities of image appearance formation in the human interaction process are found out in the article. The basic mechanisms and phenomena that affect the interethnic perception process are analyzed. A research procedural and methodological support is proposed. The basic directions of face research as the means of communication are found out. The stages of experimental part of research are described. The main results of research are discussed and illustrated with empirical data. The role of interethnic face perception in different areas of human life is discussed.

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1. Introduction

The vast majority of researches on nonverbal communication are devoted to a person's face: traditionally it is believed that face is the main part of appearance and its expression plays the most important role in human communication. As it's well known, the face can send many social signals that are correctly perceived and interpreted by others. They report on age, gender, character, intention and state of their owner. It is not surprising that interest in face originated in ancient times and has not lost its relevance today. The problem of perception and face recognition is actively investigated by various areas of psychology and related disciplines, which are some of the nodal elements of modern scientific knowledge.

Particularly noting is the problem of ethnic specificity of perception and interaction. Modern scientific researches of many foreign psychologists concentrate their attention on the phenomenon of "cross-race effect" – a reduced ability to recognize faces and facial expressions and understand people who don't belong to the own ethnic group. It means that people tend to recognize faces and emotional facial expressions of people of their own race versus other race or ethnic group better.

The study of cross-racial effect as a socio-psychological mechanism of the process of inter-ethnic perceptions is conducted mainly by foreign scientists. Description of the features and the impact of this mechanism can be found in

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the works of such scholars as M. Snyder, E. Tanke, E. Berscheid, J. Marcon, C. Meissner, R. Malpass, M. Hewston, H. Jaspars, U. Hess, A. Kappas, R. Bause, H. A. Elfenbein, N. Ambidi, C. Cooper, B. Mullen, A. Alvergne, R. Oda, C. Faurie, V. Durand, M. Raymond, A. Matsumoto-Oda, Y. Nixon, P. Bull, etc.

Analysis of the literature shows that in our psychological science this effect has not been studied widely. This can be explained by the fact that for more than half a century in the USSR there existed an unofficial ban on research of ethnic psychology, especially the psychology of ethnic relations. Until the 1980s there practically was not any theoretical and methodological development. Therefore, the problem of cross-race effect in particular remains uncharted.

According to some scientists, the cross-race effect is not related to the physiognomy of a particular racial or ethnic group, considering that this advantage doesn't depend on race or ethnic type of a person's face. For example, in an experiment where the same set of faces of Asian and Caucasian face types were tested as stimuli, Caucasian participants demonstrated advantage in recognition of Caucasian faces, whereas Asian participants showed a great recognition of Asian and Caucasian faces (Furl, Phillips & O'Toole, 1994). The presence of cross-race effect confirmed meta-analytical studies (Bothwell et al., 1989; Shapiro & Penrod, 1986, Meissner & Brigham, 2001) where better recognition of own race had been demonstrated by a wide range of experiments. Thus, during two decades of researches there was confirmed the assertion that people are better at recognizing faces of their own racial or ethnic group other than those of other groups.

Cross-race effect is scientifically researched in behavioral biology, human ethology and social psychology. In social psychology cross-racial bias is described as an intra-group attachment. In a narrow sense, the cross-race effect is a special form of inner group attachment because it occurs only in interracial or inter-ethnic situations.

This effect is manifested in the fact that people tend to perceive people of other races all "look alike" (Sporer, 2001a). Individuals of a particular race are different from each other, in our ideas, in relation to our knowledge of other nationalities, as well as to proximity and contacts with race or ethnic group as a whole. Thus, to the Europeans all Asians look the same, while to the Asians the white-skinned people all look the same (Sporer, 2001b). This phenomenon shows that we may have difficulty perceiving the uniqueness or individuality faces of a different race or ethnic group.

"Trends in Managing Mobility 2007" found that 30% of the failed negotiations could be indirectly traced back to the cross-race effect (ECA International, 2007). Researchers indicate the negative consequences of cross-race effect, which include decreased emotional intelligence, poor estimation accuracy, low ability to communicate, lack or failure of empathy and a reduced ability to fully assess the negotiations situation (Hugenberg, Miller, & Claypool, 2007).

Many psychologists have also made attempts to improve the accuracy of the perception of other ethnic groups and races using educational lectures and trainings (Nixon & Bull, 2005; Pruegger, & Rogers, 1994; Jecker, Maccoby, & Breitrose, 1965; Costanzo, & Archer, 1989).

In spite of other-race effect results reliability in the psychological literature (Shapiro & Penrod, 1986; Meissner & Brigham, 2001), the main explanation for this phenomenon is less defined. Most hypotheses are based on the difference in the "contact" or experience with faces of own and other ethnic groups. At the most basic level, the contact hypothesis predicts the relationship between the amount of experience that we have with the faces of other ethnic groups and the level of cross-race effect. But communication and interaction experience is not the only factor that affects the quality of face recognition. Important factors may be individual – psychological characteristics, values, attitudes and personality stereotypes. The aim of our study was to identify the main factors relevant for the process of face recognition of own-and other-ethnic groups' representatives.

2. Methodology

Detection of cross-race effect as a mechanism of inter-ethnic perception of appearance is the most efficient in the case of a study of remote ethnic groups whom Ukrainians have the least ability to contact with. That is why the experiment conducted by us was predicted to discover the peculiarities of face recognition of the Chinese, Arabian, African and Indian people.

2.1. Participants

In general, 351 persons participated in first and second part of research. 271 students from Kiev National University named after T. Shevchenko (Kyiv) and Chernivtsi Industrial College of the National University "L'viv Polytechnic" (Chernivtsi) were the participants. 148 of the participants were female and 123 participants were male, aged from 18 to 25. Also 80 more people from 15 to 50 years old (36 male and 44 female) participated in the ascertaining experiment. Nationality – Ukrainians (by self-identification). Profiles of other nationalities were not taken into account and not treated in this investigation.

2.2. Stimuli and Materials

The first part of the study was conducted after a questionnaire was specially created. It consisted of methodic, addressed to study individual psychological features of examinees' personalities ("the Big Five"), social perception of other ethnic groups' representatives (the E. Bogardus social distance scale), personal differential and specially created questionnaire aimed to determine the communication experience presence and duration with representatives of other ethnic groups.

The second part of the empiric study was conducted along with the first part and provided the conduction of ascertaining experiment using photo materials. Experiment was held in two stages and consisted in demonstration of photo series of the Chinese, African, Arabian, Indian and Ukrainian people's faces. In general there were 20 photographs of faces in each series of materials (each included 4 photos of every ethnic group representatives: 2 male and 2 female, of different age categories). The motivating materials included images of typical representatives of the mentioned above ethnic groups that were randomly chosen beforehand among "real" people that passed by in the street and agreed to be photographed. The individuals were photographed in a frontal pose with a neutral expression at a distance of 75 cm. twenty faces that had no facial hair or glasses were selected as face stimuli.

2.3. The procedure

The examinees' task was to recognize the faces they had been shown earlier in two series of images. The first series showed a number of photographs, one at a time, of the own group representatives and representatives of other ethnic groups (Indians, Arabians, Chinese and Africans).

Photo images were successively demonstrated on the PC screen from the distance of approximately 50 cm from the viewer. Each image was being demonstrated for 1 second, with no return to a previous image.

After certain amounts of time some part of these images, randomly chosen, were shown again along with the images that had not been demonstrated earlier (the distracting motives). Respondents had to answer each time if they had seen the image of a certain person earlier (Yes/No). Each photo was being demonstrated for 4 seconds. This way the results of face perception quality and cross-race effect display were received.

3. Results

The received data stated that Ukrainians tend to recognize faces of their own ethnic group representatives better than those of other ethnic groups. This may show the impact the cross-race effect has on the perceptual process. The most difficulties occur in perceiving the Chinese and Indian people (both male and female). In particular, the most mistakes happened in detecting the face of a male Chinese (68%), Indian (58%), female Indian (46%) and female Chinese (46%). Faces of own ethnic group representatives are detected the best, but it concerns male sex more. As for women, there were a few mistakes identifying faces that had been seen earlier.

During this research we were verifying the hypothesis about the influence of personal features, tendencies of behavior, experience of communication with foreign people and social distance on the quality of face perception. We found out that such factors as individual and psychological features (in particular, with person expressivity and

friendliness) and the other ethnic groups' acceptance level (table 1) have a considerable impact on the process of face recognition. Nevertheless, none of the personal factors of the Big Five or the Leary test does not have the direct causal connection with the quality of face perception.

Table 1. Correlation of correct face identification and individual-psychological features

Features	R	p
Warmth	0.18	< 0.01
Understanding	0.18	< 0.01
Attachment	0.12	< 0.05
Curiosity	0.13	< 0.05
Daydreaming	0.26	< 0.001
Plasticity	0.17	< 0.01
Expressivity	0.24	< 0.001
Friendliness	0.15	< 0.05
Responsibility	0.19	< 0.01
Sensitivity	0.15	< 0.05
Acceptance	0.71	< 0.001

A hit (H) was defined as the correct identification of a previously viewed target when he/she was presented in the lineup (TP lineups). A false alarm (F) was defined as any identification of a no target face from a TA lineup. These hit and false-alarm rates were used to compute signal detection estimates of discrimination accuracy and response bias, and these combined estimates were examined across all variables (cf. Meissner et al., 2008). Discrimination accuracy was calculated using A'.

We calculated the partial correlations and thanks to those we can confidently affirm the causes that underlie the variation of face perception accuracy. The received research results showed us that accuracy of face perception is directly and positively influenced by: self-esteem of sociability (the factor of personal differential derived by us) ($r = 0,14$; $p < 0,05$), and also by the duration of communication with Indian people ($r = 0,3$; $p < 0,001$), Arabian people ($r = 0,21$; $p < 0,01$), Chinese people ($r = 0,14$; $p < 0,05$), African people ($r = 0,2$; $p < 0,01$). Social distance is the main factor that reduces the accuracy of perception ($r = -0,76$; $p < 0,001$).

The index of perception accuracy depends also on the objective factors. In particular, the present experience of communication with the representative of any ethnic group increases the accuracy of face perception to the A' from 0,54 to 0,58, the absence of such experience sings about the low accuracy of face perception (A' from 0,36 to 0,38), and therefore the presence of cross-race effect. Gender differences in perception were discovered. Women tend to recognize faces better ($A' = 0,48$) than men ($A' = 0,38$) ($U = 11899$; $p < 0,001$). Examinees with higher education ($A' = 0,42$) and unfinished higher education ($A' = 0,47$) recognize faces better than people with secondary education ($A' = 0,33$) ($H = 18,64$; $p < 0,001$). We should note that age factor also correlates with the accuracy of perception ($r = 0,21$; $p < 0,001$). As the most of examinees with higher education are older than those who have secondary education only, we checked the correlations of perception accuracy with age and level of education separately in each sample. It was discovered that age is the factor that influences the perception accuracy only in the young male and female without higher education sample, thus in the period when certain brain functions are still forming. Age does not affect the face perception among students and people with higher education. Therefore the age itself cannot be the reason of face perception accuracy increase. We think that the main factor is the experience of communication with foreign people that a person can gain while studying in college or university.

The education type is also affecting the quality of face perception greatly: the lowest indicators belong to people with military ($A' = 0,38$) or technical ($A' = 0,32$) profession, humanitarians tend to recognize faces better ($A' = 0,5$) ($H = 33,2$; $p < 0,001$). Place of residence also affects the accuracy of perception greatly ($U = 5379$; $p = 0,003$). City residents recognize faces more accurately ($A' = 0,46$) than village residents ($A' = 0,34$).

As we can see there are plenty of objective factors that affect the accuracy of face perception. The influence of most of them can be explained by the simple ability to gain experience of face recognition: city residents with higher education have more experience of communication with foreigners than village residents and schoolchildren. The influence of sex is more difficult to explain. It may be connected with the social distance. To verify this hypothesis we checked the dependence of social distance index and experience of communication from the mentioned above factors.

The study results showed that the social distance of women is lower than that of men ($U = 6571,5$; $p < 0,001$). Humanitarians have lower social distance than people with military or technical professions ($H = 20,09$; $p < 0,001$), village residents have greater social distance than city residents ($U = 3169,5$; $p = 0,026$). This way the better results of face perception by women, humanitarians and city residents can be explained by the lower index of social distance, therefore by the greater readiness to accept foreigners. Basing on the data of our study the social distance is the main factor of face perception accuracy decrease.

One more factor that affects the display of cross-race effect is the duration of communication with foreign people. Present experience of communication may be connected with the short episode or constant process of communication. Our study has revealed the information about presence and duration of communication with representatives of different ethnic groups. It was discovered that examinees with higher education and college students (people with uncompleted higher education) have great experience of communication with foreigners, especially with the Arabian people. But partial correlations show that communication with Indian people ($r = 0,18$; $p < 0,01$), Arabian people ($r = 0,13$; $p < 0,05$) and African people ($r = 0,21$; $p < 0,01$) increases the social distance. Therefore people with higher education have more experience in communicating with foreigners that leads to increase of social distance and at the same time assists in gaining experience of face perception and recognition. That is why even when addressing the foreigners negatively, the communication experience factor facilitates the development of face perception accuracy.

4. Conclusions

Therefore the process of perception of another person or whole ethnic group can be accompanied by various effects such as cross-race effect and cross-race fixing that can spoil the process of perception and affect the interpersonal interaction. Results of our study have proven the presence of cross-race effect because the Ukrainians recognized faces of representatives of their own ethnic group better than those of others. Data receives showed that that besides the previous experience of communication with representatives of other ethnic groups, the process of face perception and recognition is also affected by such factors as personal features, duration of communication and social distance. Sex, age, education and place of residence also affect the display of cross-race effect. In particular, women, adults and young men, people with higher education and those who reside in the cities tend to recognize faces of foreigners better. Nevertheless, the display of cross-race effect needs a deeper study. In particular, it is important to detect the peculiarities of bilateral perception and recognition between Ukrainians and representatives of other ethnic groups, not only distant, but also related (Russians, Polish, Tatars, Georgians, Romanians, Romes and others).

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